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Complete Specification Left, 10th May, 1893—Accepted, 12th Aug., 1893

PROVISIONAL SPECIFICATION.

Improvements in or relating to the Treatment of Milk, Cream, and Various Food Materials, and in Apparatus therefor.

I, ADAMANTIUS JOHN MICHAEL BOLANACHI, of Daphne Cottage, Buccleuch Road, West Dulwich, in the County of Surrey, Chocolate Manufacturer and Confectioner, do hereby declare the nature of this invention to be as follows:—

This invention relates to the boiling, drying, mixing, heating or cooling of various food materials, such as milk, cream, sugar and the like and to the apparatus employed therein. The apparatus may consist of either a vacuum or an open pan provided with stirring mechanism and the usual jackets which are employed for heating or cooling purposes as required.

Inside the vacuum pan I place any suitable framing gearing *etc.* adapted to operate the stirring and scraping mechanism; this may be conveniently arranged in the form of a rotary frame or scraping and mixing apparatus whose axis of motion would coincide with the axis of the pan and be driven by a shaft passing through a stuffing box say in the top of the pan, the motion being imparted to the shaft by suitable gearing belts or the like, all necessary shafting *etc.* outside the pan being carried in suitable bearings or supports. Upon the driving shaft of the scraping and mixing mechanism inside the pan I may place one or more toothed wheels adapted to gear with other wheels for the purpose of imparting motion to the stirrer which is journaled in the scraper. The stirrer may consist of any suitable form of revolving arms which may be fixed upon the shaft which is caused to revolve in the manner above described. The scraper may be arranged to engage with the interior of the pan upon one or more parts at once and the scraper itself may be made solid and of the form of the pan or preferably in sections operating together and if necessary pressed by springs or so shaped as to cause the material to press them against the wall of the pan.

The discharge branch which will preferably be situated at the bottom of the pan in the line of its axis may be employed to act as a bearing for the stirring and scraping mechanism which may be made to lift out of the pan if desired.

The stirrers in any desired part of the internal apparatus may be made hollow so that steam, hot or cold water or other medium may be introduced therein preferably through the shaft to facilitate the operations going on in the pan. Similar stirring apparatus may be employed with the open pan which as well as the vacuum pan may be jacketed in any required manner, and provided with suitable means for conveying the heating or cooling medium to the jacket and to the stirrers and means for introducing the material into the pan particularly the vacuum pan, and means for withdrawing it, charging vessels being connected and employed if desired and all the usual pipes, cocks, gauges, air pumps and the like being employed as required. To facilitate the heating or cooling more especially with the open pan I may employ a movable vessel, coil, or the like adapted to be let down into the liquor and having means, such for example as flexible tubes for introducing and removing the water or other heating or cooling medium.

The following will serve to illustrate some of the processes which may be carried out with the assistance of the above described apparatus producing results not hitherto attained. For example in the preparation of what is known as sugar cream for confectioners and chocolate manufacturers. The usual course is to boil the cream in an open pan at a high temperature say  $240^{\circ}$  then to remove it from the pan and place it on a cooling slab, generally with cold water passing through it, and under it, and afterwards either to beat and stir it by hand or to



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transfer it to another vessel in which it is stirred and thus turned into what is technically called sugar cream. In preparing this material I place the materials consisting of sugar and glucose into the pan where it is simply boiled without the assistance of the stirrers, then the steam is removed and a cooling medium say water is introduced through the jacket and the stirring apparatus and the material cooled down sufficiently after which the stirrers are set in motion and the sugar cream produced without ever removing it from the original pan or apparatus thus greatly facilitating the manufacture, saving handling and dispensing with the cooling slab and the separate stirring apparatus. 5

I can thus make 10

(1) Any kinds of fruit into jam.

(2) Convert sugar and glucose into cream cooled finished and ready for use after a single process without graining the cream; also any other saccharine matter for boiled sugar goods.

(3) Make and mix condensed milk and convert it into a saccharine matter to any density required with or without the addition of cocoa, coffee extract or other alimentary material. 15

(4) Condense and mix essences of meat, tea, coffee extract, chocolate, cocoa *etc.*, with or without other ingredients for food, also liqueurs, syrups of fruits and other essences. 20

(5) Convert starch into gum either solid or liquid.

(6) Complete the manufacture of gum or dextrine from starch by condensation in the vacuum pan and produce it either in a solid or liquid state.

(7) Prepare syrup for crystallising fruits or other confectionery and so save the virtue of it as to greatly improve the crystallization. 25

(8) Make Turkish delight greatly superior to any heretofore made.

(9) Infants and invalids food; lentil food and soups either liquid or dry.

It will be understood that all the details requisite for carrying out this invention cannot be set forth in this Provisional Specification, these are reserved for their proper place in the Complete Specification. Modifications in the parts described may be made without departing from the spirit of this invention. 30

Dated this 13th day of August 1892.

W. P. THOMPSON & BOULT,  
Agents for the Applicant.

## COMPLETE SPECIFICATION. 35

Improvements in or relating to the Treatment of Milk, Cream, and Various Food Materials, and in Apparatus therefor.

I, ADAMANTIUS JOHN MICHAEL BOLANACHI, of Daphne Cottage, Buccleuch Road, West Dulwich, in the County of Surrey, Chocolate Manufacturer and Confectioner, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:— 40

This invention relates to the boiling, drying, mixing, heating or cooling of various food and other materials, such as milk, cream, sugar, drugs and the like and to the apparatus employed therein. The apparatus may consist of either a vacuum or an open pan provided with stirring and scraping mechanism and the usual jackets which are employed for heating or cooling purposes as required and will be best understood by reference to the accompanying drawings, in which 45

Fig. 1 is a side elevation partly in section of the vacuum pan, and

Fig. 2 is a similar view of an open pan, like letters representing like parts in both drawings. 50

Inside the vacuum pan A, I place a suitable supporting framing A<sup>1</sup> to which is secured the fixed wheel B through whose centre and the framing passes the shaft C which carries the frame D having scrapers D<sup>1</sup>, the frame and scrapers revolving



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with the shaft C. In the frame D is carried the shaft E upon which are the stirring arms E<sup>1</sup> which revolve with the shaft E. In the upper portion of the frame D are the channels C<sup>1</sup> communicating with annular grooves upon the shaft E into which grooves open the passages E<sup>2</sup> in the shaft E which pass through the stirrers E<sup>1</sup> or communicate with the hollow interior thereof for the purpose of introducing heating or cooling media such as steam or cold water or a freezing mixture to the stirrer and thus assist to heat or cool the contents of the pan. The shaft E has fixed upon its upper end the wheel E<sup>3</sup> gearing with the pinion E<sup>4</sup> fixed upon the same shaft which carries the pinion B<sup>1</sup> which engages with the fixed wheel B. The result of this arrangement is that while the whole frame D revolves carrying the stirrer with it around the pan, the stirrer by the same movement also revolves upon its own axis, being turned upon shaft E through the medium of the wheel E<sup>3</sup>, pinions E<sup>4</sup> and B<sup>1</sup> and the fixed wheel B. The shaft which carries the pinions B<sup>1</sup> and E<sup>4</sup> is carried in or by the frame D and together with the pinions B<sup>1</sup> and E<sup>4</sup> revolves with it.

The shaft C passes through a stuffing box A<sup>2</sup> in the top of the pan A and also through the fixed framing F and carries upon its upper end the bevel wheel C<sup>2</sup> with which engages the bevel pinion C<sup>3</sup> driven by hand or power in any convenient manner. The shaft C passes through the double stuffing box G supported in any convenient manner in the framing and between the two packing rings has the annular groove C<sup>4</sup> communicating with one of the channels C<sup>1</sup> which are continued up through the shaft C to the top, one of them terminating in the groove C<sup>4</sup> and the other one being continued to the end of the shaft which terminates shortly beyond the stuffing box G. In the stuffing box G is a passage G<sup>1</sup> communicating with the groove C<sup>4</sup> and also with a pipe H having a cock H<sup>1</sup> by which it may be opened or closed. Above the stuffing box G is another pipe I provided with a cock I<sup>1</sup>, by this arrangement the heating or cooling medium may be introduced, say by the pipe I and carried down the shaft C to one of the channels C<sup>1</sup>, from there to the perforated shaft E and down one of the channels E<sup>2</sup> through the stirring arms and back again by the other channel E<sup>2</sup> into the second channel C<sup>1</sup> in the shaft C, and from there by the groove C<sup>4</sup> into the passage G<sup>1</sup> and so away by the pipe H. By this means it will be readily seen that the stirrer which has been used say for heating can be immediately changed and be used for cooling the contents of the pan, while the pan itself being jacketted and heated by steam and the like in the usual manner and provided with the necessary pipes, cocks, and appliances, can be also promptly changed from hot to cold and *vice versa*, so that the contents of the pan are not merely subjected to the cooling or heating influence of the pan itself but to the cooling or heating influence of the stirrer as well. It will be also seen that if desired the channels C<sup>1</sup> may be carried throughout the framing D and scrapers D<sup>1</sup> thus increasing the effect. The pan itself being a fixture may be connected with any suitable pump or other vacuum creating apparatus and also by the pipe J having a cock J<sup>1</sup> with the jacketted vessel J<sup>2</sup> by which the pan may be charged, the discharging taking place in any convenient and well-known manner, say for example by the discharge orifice A<sup>3</sup> and hand-controlled valve A<sup>4</sup> at the bottom of the pan and connecting with the interior thereof but not with the interior of the jacket.

The open pan is set forth in Fig. 2 and may be of the ordinary jacketted construction provided with the necessary pipes and fittings to introduce into the jacket the heating or cooling medium. This pan A is provided with a removable stirring apparatus which can be introduced into or removed from the pan while the latter is in use, the stirring apparatus being placed in or withdrawn from the liquid contained in the pan. This stirring apparatus is provided with means similar to those described with reference to Fig. 1 for introducing to it a heating or cooling medium and is of very great importance in dealing with some of the confectioners' materials say for instance converting sugar and glucose into cream. The shaft C is provided with the channels C<sup>1</sup> and stuffing box G, pipes H and I and fittings as before and has secured upon it the stirrer arms E<sup>1</sup> with the interior of which



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communicate the channels C<sup>1</sup> in the same manner as the channels E<sup>2</sup> of Fig. 1. The frame D carries the scrapers D<sup>1</sup> and also the stirring arms D<sup>2</sup> connected to the frame and to the bosses D<sup>3</sup> surrounding the shaft C. On the top of the frame D is the sleeve D<sup>4</sup> passing through the frame F and carrying on its upper end the bevel wheel D<sup>5</sup> with which engages the bevel pinion K fixed upon the shaft K<sup>1</sup> driven by hand or power in any convenient manner. The frame D is thus revolved within the pan A in one direction while the shaft C and stirrer arms E<sup>1</sup> are revolved in the opposite direction by means of the bevel wheel C<sup>2</sup> also engaging with the bevel pinion K and secured upon the shaft K<sup>1</sup> near its upper end. This internal heating or cooling apparatus need not of necessity be a stirrer at all—a coil of pipe would serve, but I prefer it to act as a stirrer, especially for beating “sugar cream.”

For convenience of operating it is desirable that the whole of the frame D and stirring apparatus should be capable of being moved into or out of the pan A but that such movement should not interfere with the operation of those parts nor with the circulation of the heating or cooling medium through the stirrer. To accomplish this the pipes H and I are conveniently made of flexible material and the whole of the stirring apparatus, its driving mechanism and the frame F, to rise and fall conveniently by means of the cord or chain L connected at L<sup>1</sup> with the frame F passing over the pulleys M and carrying the counter-poise N. All therefore that is necessary is to move the counterpoise down or up the apparatus partaking of movement in the opposite direction. The frame F has fixed to it the rods or guides F<sup>1</sup> which work in suitable bearings in the fixed frames O. Any convenient arrangement of belts or pulleys or gearing may be employed for driving the shaft K<sup>1</sup> while allowing of its up and down movement.

The frame D may be a simple frame as indicated in the drawings or may be in the form of a cage, the latter construction being useful where provision is made for carrying the heating or cooling medium throughout the frame.

The following will serve to illustrate some of the processes which may be carried out with the assistance of the above described apparatus producing results not hitherto attained.

For example, in the preparation of what is known as “sugar cream” for confectioners and chocolate manufacturers, the usual course is to boil the sugar or sugar and glucose in an open pan at a high temperature say 240°, then to remove it from the pan and place it on a cooling slab, generally with cold water passing through it, and under it, and afterwards either to beat or stir it by hand or to transfer it to another vessel in which it is stirred and thus turned into what is technically called “sugar cream.” In preparing this material I place the materials consisting of sugar and glucose into the pan where it is simply boiled without the assistance of the stirrers, then the steam is removed and a cooling medium say water is introduced through the jacket and through the stirring apparatus and the material cooled down sufficiently after which the stirrers are set in motion and the sugar cream produced without ever removing it from the original pan or apparatus thus greatly facilitating the manufacture, saving handling and dispensing with the cooling slab and the separate stirring apparatus.

The heating medium may be employed in say the jacket and the cooling medium in say the stirrer or other internal apparatus or *vice versa* at the same time whereby the treatment is greatly improved.

I can thus

- (1) Make any kinds of fruit into jam.
- (2) Convert sugar or sugar and glucose, into cream cooled, finished and ready for use after a single process without graining the cream, also any other saccharine matter for boiled sugar goods.
- (3) Make and mix condensed milk and convert it into a saccharine matter to any density required with or without the addition of cocoa, coffee extract, or other alimentary material.
- (4) Condense and mix essences of meat, tea, coffee extract, chocolate, cocoa &c.,



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with or without other ingredients for food, also liqueurs, syrups of fruits and other essences.

(5) Complete the process of converting starch into gum either solid or liquid.

(6) Complete the manufacture of gum or dextrine from starch by condensation  
5 in the vacuum pan and produce it either in a solid or liquid state.

(7) Prepare syrup for crystallizing fruits or other confectionery and so save the virtue of it as to greatly improve the crystallization.

(8) Make Turkish delight greatly superior to any heretofore made.

(9) Infants and invalids' food, lentil food and soups, either liquid or dry.

10 It will be understood that the arms, framing, &c., previously described as being stirring apparatus could be used without revolving or "stirring" at all, merely as a means of heating or cooling the materials in the pan by the circulation through them of the heating or cooling medium. I prefer however and in some of the operations it is nearly if not quite essential that this portion of the mechanism  
15 should act as stirring mechanism as well as heating or cooling mechanism and I have therefore so described and illustrated it.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I wish it to be understood that I am aware that stirrers in open pans have before now been employed,  
20 and that I make no claim to that combination; what I claim is,—

1. The combination with a vacuum pan of internal stirring or scraping apparatus.

2. The combination with a vacuum or open pan of internal stirring scraping or stationary apparatus through which a heating or cooling medium can be passed.

25 3. The process of making "sugar cream" which consists in boiling cooling and beating the sugar or sugar and glucose in the same vessel in a continuous process.

4. The process of preparing food and other materials by subjecting them to both heat and cold at the same time by the hot pan and cold internal apparatus or  
30 *vice versa*.

5. The combination with a vacuum pan of a rotary framing D carrying a shaft E provided with stirrer arms E<sup>1</sup> and gearing B B<sup>1</sup> E<sup>4</sup> E<sup>3</sup> for driving the shaft substantially as described and illustrated in the accompanying drawings.

6. The combination with the apparatus described in Claim 5 of a shaft such  
35 as C having channels C<sup>1</sup> shaft E having channels E<sup>2</sup> stuffing box G and pipes H and I substantially as described and illustrated in the accompanying drawings.

7. The combination with an open pan of a stirring or scraping apparatus adapted to be moved into and out of the pan or a fixture therein and with means for circulating the heating or cooling medium through it substantially as described and  
40 illustrated in the accompanying drawings.

8. The combination with an open pan of a frame D having scrapers D<sup>1</sup> and arms D<sup>2</sup> sleeve D<sup>4</sup> bevel gearing D<sup>5</sup> K and C<sup>2</sup> shaft C having channels C<sup>1</sup> and arms E<sup>1</sup> the whole constructed and operating substantially as described and illustrated in the accompanying drawings.

45 9. The combination with the apparatus detailed in the last two claims of a counterpoise N chain or cord L pulleys M and flexible pipes H and I substantially as and for the purpose described and illustrated in the accompanying drawings.

Dated this 9th day of May 1892.

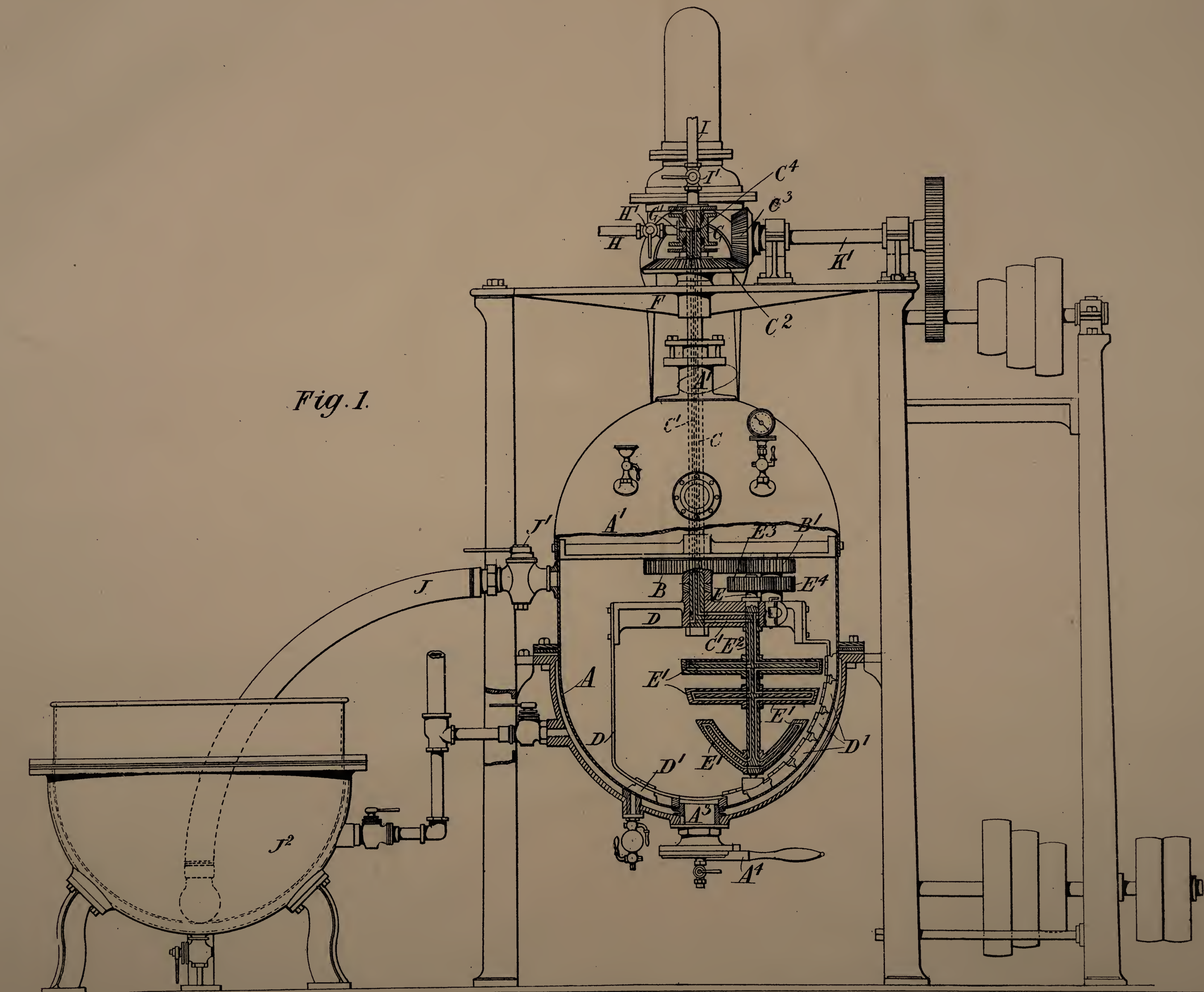
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Agents for the Applicant.









*[This Drawing is a reproduction of the Original on a reduced scale]*





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